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(54) Pallet made of plastics

This document describes a plastic pallet consisting of an upper and a lower component, where the upper component comprises two mirror-image panels, each having longitudinal and transverse ribs (4, 5) on one side. The free edges of the longitudinal and transverse ribs are welded to each other, forming rigid tubes (7, 8, 9) that also run in the longitudinal and transverse directions and have an approximately rectangular cross-section. The lower component of the pallet which is also welded to the upper component, is formed by isolated feet or parallel skids (11), or by window crossbars.

(32 05 910)

(Fig. 3)

(vertical): **DE 32 05 910 A 1**

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Patent Claims

1. Pallet made of plastics, having an upper and a lower component, characterized in that the upper component (1) consists of two panels (2, 3), each of which is provided with longitudinal and transverse ribs (4, 5) on one side; that the ribs (4, 5) of the two panels (2, 3) are mirror images of and welded to each other by their free edges; and that the ribs (4, 5) are configured in such a way that in the welded state they form tubes (7, 8, 9) of approximately rectangular cross-section, that extend in the longitudinal and transverse directions.
2. Pallet according to Claim 1 characterized in that between the tubes (7, 8, 9) the panels (2, 3) are designed with matching openings (10).
3. Pallet according to Claim 1 or 2 characterized in that the edge section of the pallet is configured with multiple, tightly spaced tubes (7) having a vertical, rectangular cross-section.

4. Pallet according to one of the Claims 1 through 3 characterized in that multiple, tightly spaced tubes (9) of a vertical, rectangular cross-section, or of an approximately square cross-section are provided in each of the areas of the longitudinal and transversal centers of the pallet.
5. Pallet according to Claims 3 and 4 characterized in that tubes (8) of a horizontal, rectangular cross-section are provided between each edge section and the longitudinal or transversal center of the pallet.
6. Pallet according to Claims 2 and 5 characterized in that the openings (10) have an approximately square shape.
7. Pallet according to one of the Claims 1 through 6 characterized in that on its bottom surface the upper component (1) is equipped with foot flanges (15) which provide the connection to the lower component.
8. Pallet according to Claim 7 characterized in that the lower component is formed by isolated feet (13) located on each corner, in the longitudinal and transversal centers of the outside edges, and in the center of the pallet, and where the feet blend into the foot flanges (15).
9. Pallet according to Claim 8 characterized in that the lower component is formed by three parallel skids located in the longitudinal center and at the outer edges of the pallet, with the skids having projections (13) on each of their ends as well as in their centers, which blend into the foot flanges (15) of the upper component.

10. Pallet according to Claim 9 characterized in that the skids (11) have transverse braces (17) added to their ends and at the center that form the shape of window crossbars.
11. Pallet according to Claim 9 characterized in that the skids (11) and/or the window crossbar complements (17) have downward pointing ribbings.
12. Pallet according to one of the Claims 9 through 11 characterized in that the bottom surface of the skids (11) and/or the window crossbar complements (17) have panels (19) welded to them.

Pallet made of plastics

This invention concerns a pallet made of plastics, having one upper and one lower component.

Transport pallets are being used to a large extent in freight traffic. Apart from wooden pallets, there are also plastic pallets used that are manufactured by injection molding, either in one piece or as upper and lower components subsequently welded. Pallets are expected to have the highest possible carrying capacity as well as ruggedness. Especially the carrying capacity of pallets using a minimum of material and therefore featuring low weights, must be high enough to comply with the various test requirements found in current industrial standards.

It is therefore the object of the invention to create a pallet made of plastics which despite its high carrying capacity, strength and durability can be built with a minimum of material and therefore low weight.

To meet the objective, this invention is based on a pallet made of plastics, having one upper and one lower component, where the special feature is the design of the upper component which is made of two panels, each having a longitudinal and transversal ribbing on one side, where the ribbing of the two panels is of mirror-image design and the panels are welded to each other by their free edges, and where the ribbing is configured in such a way that in the welded condition it forms tubes of an approximately rectangular cross-section in the longitudinal and transversal directions of the pallet.

Partitioning of the upper component into two ribbed panels is the foundation for a body that after welding is very strong and has a very high carrying capacity while maintaining a light weight, due to the use of rectangular tubes as supporting components.

Additional developments of this invention are reflected in the subclaims. Between the tubes the panels may, e.g., be designed with matched openings. On the one hand such openings known in the art provide additional material savings and, on the other hand, help do drain water and other fluids.

A specifically superior strength in the edge section of the pallet is obtained when multiple, tightly spaced tubes of a vertical, rectangular cross-section are provided in this area. For the same reason multiple, tightly spaced tubes of vertical, rectangular cross-section, or approximately square cross-section, may be included in each area of the longitudinal and transversal centers of the pallet.

Because of the lower stress levels in that area, tubes of horizontal, rectangular cross-section may be used between each edge section and the longitudinal or transversal centers of the pallet, that accordingly have larger cross-sectional dimensions. The openings between the edge sections and the longitudinal or transversal centers of the pallet are beneficially, approximately square-shaped.

Pallets made of plastics have either isolated feet or parallel skids ("skid pallet") located in the edge sections and in the center, or they are configured as so-called window crossbars pallets that have the three skids connected to each other at the bottom, i.e., at their ends and in the center, leaving appropriate openings for entering a fork lift truck. The invention may be applied to all these variations. To this end, an advanced development may provide the upper component with foot flanges at its bottom that provide the connection to the lower component. If the lower component is then represented by isolated feet, one each is placed at the corners, in the longitudinal and transversal centers of the outer edges and in the center of the pallet, and blends into the foot flanges. To create a skid pallet, the lower component is represented by three parallel skids located in the longitudinal center and at the outer edges of the pallet, with the skids having projections at each end and at the center, that blend into the foot flanges of the upper component. To create a window crossbars pallet the skids may have cross braces added at their ends and at the center, to form window crossbars. In a further development of this invention, the skids as well as the window crossbar supplements have downward pointing ribbings which help to save material while maintaining high strength.

For an additional increase in strength a further development of the invention provides that a panel is welded to the bottom of the skids and/or the window crossbar supplements. Accordingly

the lower pallet component also consists of two layers welded to each other and, accordingly, like the upper component, has a sandwich structure.

In the following the invention is illustrated by drawings. They show:

- Figure 1 a side view of the right-hand part of a three-skid pallet prior to welding the individual components;
- Figure 2 a side view according to Figure 1 after welding the components;
- Figure 3 a sectional view of the right-hand pallet side according to Figure 2, along the sectional line III-III in Figure 5;
- Figure 4 a sectional view of the right-hand pallet side according to Figure 2, along the sectional line IV-IV in Figure 5;
- Figure 5 in the left-hand portion a bottom view and in the right portion a top view, each of a quarter of the pallet according to Figure 1 – 4;
- Figure 6 a side view of the right-hand portion of a window crossbars pallet prior to welding the parts;
- Figure 7 a side view according to Figure 6 after welding the parts;
- Figure 8 a lateral sectional view of the right-hand portion of the pallet according to Figure 7, along the sectional line VIII-VIII in Figure 10;
- Figure 9 a lateral sectional view of the right-hand portion of a pallet according to Figure 7, along the sectional line IX-IX in Figure 10;
- Figure 10 in the left-hand portion, a bottom view and in the right-hand portion, a top view, each of one quarter of a window crossbars pallet according to Figures 6 – 9;
- Figure 11 a lateral view of the left-hand portion of a window crossbars pallet with additional bottom panel prior to welding the parts;
- Figure 12 a lateral view according to Figure 11 after welding the parts;
- Figure 13 a lateral sectional view of the left-hand portion of the pallet according to Figure 12, along the sectional line XIII-XIII in Figure 15;
- Figure 14 a lateral sectional view according to Figure 13, along the sectional line XIV-XIV in Figure 15;

Figure 15 at left, a bottom view and at right, a top view, each of one quarter of a window crossbars pallet according to Figures 11 – 14;

Figure 16 a pallet with isolated feet, i.e., at left, a side view and at right, a lateral sectional view, along the sectional line XVI-XVI in Figure 17;

Figure 17 a bottom view of one quarter of a pallet according to Figure 16.

For simplification, the figures show only one half or one quarter of each of the pallets. The corresponding other halves or quarters are, however, alike or mirror image. The selection of the left- or right-hand pallet side is purely coincidental.

The upper component 1 of the three-skid pallet illustrated in the Figures 1 – 5 consists of two panels 2, 3 which on their bottom or top surface are provided with a mirror-image ribbing 4, 5. The free edges of this ribbing are, as shown by the weld beads 6, welded to each other after separate injection molding operations for the panels 2, 3. In the edge section of the pallet this creates tubes 7 with vertical, rectangular profiles; in the center section it forms tubes 8 with horizontal, rectangular profiles; and in the center section it generates tubes 9 with approximately square cross-sections. The area between the tubes is designed to have rectangular or square openings 10.

Figures 3 and 4 show only the tubes 7, 8, 9 running in the longitudinal direction of the rectangular pallet. However, the ribbing has been selected in a manner allowing similar tubes of rectangular or square cross-sections, which cannot be shown in the cross-sectional views of Figures 3 and 4, to run in the transverse direction of the pallet, intersecting with the tubes 7, 8, 9. This network of intersecting, rigid tubes creates a very strong upper component with a high load capacity but relatively low weight.

The lower component of the pallet is formed by three parallel skids 11. Feet 13 equipped with upward pointing ribbings 12 are provided on each end and in the center of the skids 11, where the ribbings 12 are welded to the corresponding ribbings 14 of the foot flanges 15 of the upper component 1. Ribbed panels 16 interconnect the feet 13 as they form the skids 11.

The window crossbars pallet illustrated in Figures 6 through 10 differs from the pallet according to Figures 1 through 5 only in its lower component. Therefore the same reference symbols are used and the description of identical parts is not repeated. Unlike the three-skid pallet according to Figures 1 through 5, the window crossbars pallet according to Figures 6 through 10 has its feet interconnected not only in the longitudinal direction using the ribbed panels 16, but also in the transverse direction by similarly ribbed panels 17. The three skids 11 of the skid pallet are thereby complemented to form window crossbars.

As another embodiment of the invention, Figures 11 through 15 also illustrate a window crossbars pallet which essentially corresponds with the window crossbars pallet according to Figures 6 through 10. Again, the same reference symbols will be used. The only difference is that the lower component of the window crossbars pallet according to Figures 11 through 15 has an additional panel 19 with a central opening 18 in each quarter of the pallet, with the panel 19 connected to the lower component by means of welding which turns the lower component into a sandwich structure. In this way the strength of the pallet is further increased. Also, the ribbing on the bottom surface is covered for protection. Corresponding cover panels may also be added to the three-skid pallet according to Figures 1 through 5.

As an additional embodiment of the invention, Figures 16 and 17 illustrate a pallet which differs from the skid pallet according to Figures 1 through 5 only in that the feet 13 are not connected by panels 16, i.e., the pallet is equipped with isolated feet.